

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTONAFFINITIES OF *PARANIPHARGUS LELOUPARUM*
MONOD, A BLIND ANCHIALINE AMPHIPOD
(CRUSTACEA) FROM THE GALAPAGOS ISLANDS

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Paraniphargus lelouparum Monod, 1970, is the first blind hypogean amphipod known from the Galapagos Islands. A new genus is described for this species to recognize several distinctions it has from *Paraniphargus*. The possibility that the species has sternal gills is refuted, thereby clarifying its relationships.

Terms: "Gammaridan" refers to Gammaridea in the hypothetical group level of Section. "Mark" ("M." refers to a position a stated distance from the proximal end on a scale of 0 to 100. "Melitid gnathopod 1" refers to a small, mitten-form gnathopod with transverse palm, elongate wrist and pubescence on one or more of articles 4-6. "Hadziid gnathopod 2" refers to an enfeebled female gnathopod with elongate wrist, the palm and posterior margin of the hand confluent and both armed with sparse groups of stiff, apically bent, elongate setae. These setae are also found in melitids, such as *Psammoniphargus* Ruffo, but occur on the posterior margin of the hand outside the palm.

Uropod 3 is described in the following terms:

Dispariramus, outer and inner rami dissimilar;

Aequiramus, outer and inner rami similar in length, shape and patterns of armament;

Magniramus, inner ramus extending as far as outer ramus;

Variramus, inner ramus not as long as outer ramus but medial margin with armaments;

Parviramus, inner ramus much shorter than outer ramus and lacking medial armaments, inner ramus usually very short and scalelike.

The presence of a conspicuous article 2 on the outer ramus results in a classification of dispariramus; such uropod 3 can be magniramus, variramus or parviramus; an aequiramus uropod 3 is always magniramus but a magniramus uropod 3 can be either dispariramus or aequiramus.

Galapsiellus, new genus

Type-species: Paraniphargus lelouparum Monod, 1970 (here designated).

Etymology: Contrived. Masculine.

Diagnosis: Coxal gills 2–6, ovate, weakly pedunculate, not 2-articulate. Sternal gills absent. Males and females almost identical except for penial processes of males and weak sausage-shaped oostegites 2–5 on female. Body subvermiform, all coxae very short, of similar length. Uropod 3 parviramus, outer ramus 1-articulate, peduncle greatly elongate, about as long as longest ramus on uropods 1–2 and nearly as long as outer ramus of uropod 3. Telson fully cleft, lobes apically turgid, each bearing apicomedial spine. Gnathopods of both sexes enfeebled, gnathopod 1 of melitid form, wrist elongate, anteriorly pubescent, hand weakly trapezoidal, palm scarcely oblique, short, article 4 swollen and pubescent. Gnathopod 2 broader and longer than gnathopod 1, wrist similarly elongate, not pubescent, article 4 similar, not pubescent, article 6 almost twice as long as article 6 of gnathopod 1, about 1.2 times broader, palm oblique. Palms of gnathopods sparsely setose, lacking spines except at defining corners. Wrists of gnathopods unlobate. Mandibular palp article 3 linear, bearing only E setae (apical). Lower lip with weak inner lobes. Medial setae on maxillae absent or sparse. Pleopods biramous. Urosomites free, naked, or with at most one dorsolateral setule on each side.

Galapsiellus lelouparum (Monod)

Paraniphargus lelouparum Monod, 1970:13–25, figs. 6–45.

Description: Blind. Head almost truncate anteriorly, with weak but broad and truncate anterior lobe (less accentuated than shown by Monod). Article 2 of pereopods 5–7 unexpanded, elongate, weakly pyriform; posteroventral corners right angular (or weakly sharpened in Monod's specimens). Basofacial spine of peduncle on uropod 1 situated at Mark 45, apex of peduncle extended and proboscoïd. Dactyl of maxilliped with strong apical nail (not shown by Monod).

New material: Five specimens from JLB GAL 103, Isla Santa Cruz, Galapagos Islands, Academy Bay, mangrove tidepool 300 m from sea near lower bodega of Charles Darwin Research Station, tidepool of

anchialine variety, not connected to sea at surface but fluctuating with tidal level, 23 January 1964, collected by J. L. Barnard. Associated fauna, *Ampithoe* sp., *Cheiriphotis megacheles* (both amphipods) and palaeomonid shrimps.

Observations: One specimen is a definite male, bearing small penial processes on sternite 7 of the thorax. No sternal gills are present. Presumably, therefore, the sausage-shaped appendages noted by Monod on pereonites 2–5 represented brood lamellae of a female, probably attached to the coxae but appearing to Monod to be attached to the sterna. One of these had a seta, also suggesting their identity as oostegites.

Monod's depiction of this species is excellent. New illustrations are therefore not required.

Distribution: Isla Santa Cruz, Galapagos Islands, phreatic and anchialine.

CLASSIFICATION OF GAMMARIDANS

Monod (1970) noted the potential affinities of *Paraniphargus lelouparum* as belonging to the broadly conceived groups proposed by Stephensen (1933) which included such diverse genera as *Niphargus*, *Neoniphargus*, *Paraniphargus*, *Metaniphargus* (= *Hadzia*), *Uroctena*, *Austroniphargus*, *Melita* and *Crangonyx*. He noted also the remarks of Schellenberg (1931) showing how close *Paraniphargus* lies to *Melita* and how Stephensen (1933) placed *Paraniphargus* into a subgroup containing *Niphargus*, *Neoniphargus*, *Niphargopsis*, and *Metaniphargus* (= *Hadzia*).

These genera are now better divided into the following groups, some of which are briefly characterized (see in part, Bousfield, 1973).

I. Crangonychoids (Crangonychidae, Bousfield, 1973). A primitive superfamilial group characterized by either true sternal gills, paddle-shaped calceoli or the presence of densely packed bifid-trifid spines on the palm of male gnathopod 2. Including, for example, most freshwater genera of Australia (*Neoniphargus* Stebbing, *Uroctena* Nicholls); South Africa (*Paramelita* Schellenberg); *Falklandella* Schellenberg and *Phreatogammarus* Stebbing from Falkland and New Zealand, respectively; *Pseudocrangonyx* Akatsuka and *Procrangonyx* Schellenberg (= *Eocrangonyx* Schellenberg) from east Asia; plus the Holarctic crangonyxes. Numerous other genera.

II. Gammaroids (Gammaridae, Bousfield, 1973). Sternal gills absent. Palm of male gnathopod 2 not densely lined with bifid or trifid spines. Coxal gill 7 present or occasionally absent in apomorphic forms otherwise derivable from gammaroids; or marked by plesiomorphic characters such as tympanic calceoli in males. Eighty-five genera, numerous groupings, examples, *Gammarus* J. C. Fabricius, *Chaetogammarus* Martynov, *Acanthogammarus* Stebbing, *Amathillina* Sars, *Sarothrogammarus* Martynov, *Pontogammarus* Sowinsky, *Micruropus* Stebbing.

A. Anisogammarids. Palms of male gnathopods with peg-spines. *Anisogammarus* Birstein, *Spinulogammarus* Tzvetkova, *Eogammarus* Birstein, *Bathyceradocus* Pirlot, *Metaceradocoides* Birstein and Vinogradova (and see below).

B. Mesogammarid. Apomorphic form. *Mesogammarus* Tzvetkova.

C. *Micruropus alaskensis* Bousfield and Hubbard. Apomorphic (new genus, Bousfield, in prep.).

D. *Eoniphargus* Ueno. Apomorphic form with tympanic calceoli.

III. Gammarelloid Groups. One or both gnathopods scarcely or not prehensile, but coxal gill 7 usually retained. Divisible into groups characterized by *Gammarellus* Herbst, *Cheirocratus* Norman, *Hornellia* Walker, *Megaluropus* Hoek, *Argissa* Boeck, *Melphidippa* Boeck and *Macrohectopus* Stebbing.

IV. Hadzioids (Hadziidae, Karaman, 1943; Melitidae, Bousfield, 1973). Sternal gills absent. Coxal gill 7 absent. Gnathopods subchelate except for special form of female hadziid gnathopod 2. Calceoli absent. Loss of any other marker attributes showing immediate descent from Crangonychoids and Gammaroids. Probably polyphyletic and subject to further elaboration.

A. *Melitids*, to contain *Melita* Leach, *Eriopisa* Stebbing, *Dulichella* Stout, *Melitoides* Gurjanova, *Psammophargus* Ruffo, and several new genera. Uropod 3 dispariramus. Lower lip with inner lobes. Female gnathopod 2 with distinct palm lacking groups of bent setae.

1. Subgroup to contain *Psammogammarus* S. Karaman, characterized by loss of sexual dimorphism on gnathopod 2, possibly *Eriopisa longiramus* Stock and Nijssen to be distinguished generically by variramus uropod 3. Divergent from ancestors of *Eriopisa*.
2. Subgroup to contain *Paraniphargus* Tattersall characterized by loss of medial setation on maxillae and possibly by loss of sexual dimorphism in gnathopod 2; retaining enlarged coxae unlike subgroup 1. Derivative from *Melita*.
3. Subgroup to contain *Galapsiellus*, new genus, characterized by reduction of medial setation on maxillae, reduction of anterior coxae, partially mittenform gnathopod 2 lacking sexual dimorphism. Derivative from *Eriopisa*.

B. *Hadziids*, to contain *Hadzia* Karaman, *Dulzura* J. L. Barnard and new genera (in part, see Zimmerman and Barnard, in press). Uropod 3 dispariramus. Lower lip lacking inner lobes. Female gnathopod 2 lacking palm but dactyl closing against margin furnished with sparse groups of stiff, elongate, apically bent setae. Other genera removed to weckeliids and ceradocids.

1. *Metacrangonyx* Chevreux. Group characterized by entire telson and miniaturized uropod 3.

C. *Eriopisellids*, to contain *Eriopisella* Chevreux, *Netamelita* J. L. Barnard, *Indoniphargus* Straskraba, and *Microniphargus* Schellenberg. Both sexes with fully mittenform gnathopods.

1. *Bathyonyx* subgroup to contain *Bathyonyx* Vejdovsky. Characterized by especially reduced maxillary spination.

2. *Niphargus pulchellus* Sayce. Australia.

D. Salentinellids, to contain *Salentinella* Ruffo, *Parasalentinella* Bou. Gnathopods mittenform but article 2 of pereopods 5-7 expanded and lobate.

E. Austroniphargids, to contain *Austroniphargus* Monod and a new genus (*Austroniphargus starmuhlneri* Ruffo). Characterized by hammer-like gnathopods bearing lobular wrists. Urosomites coalesced. Possibly of direct crangonychoid descent.

F. Pseudoniphargids, to contain *Pseudoniphargus* Chevreux. Gnathopod 1 of melitid form, hammer-like. Gnathopod 2 enlarged, palm oblique, wrist short, scarcely lobate. Telson almost entire.

G. Niphargids, to contain *Niphargus* Schiödde, *Pontoniphargus* Dancau, *Haploginglymus* Mateus and Mateus, *Niphargopsis* Chevreux, *Niphargellus* Schellenberg and *Carinurella* Sket. Characterized by hammer-like gnathopods resembling mittens but enlarged, or apomorphically derived from enlarged hammer-like gnathopods lacking palmar spines, wrists unlobate.

H. Ceradocopsids, to contain *Ceradocopsis* Schellenberg (= *Maeracantha* Stephensen), *?Metaceradocoides* Birstein and Vinogradov. Uropod 3 miniaturized, retaining conspicuous article 2 on outer ramus.

I. Nuuanuids (see McKinney and Barnard, in prep.), to contain *Cottesloe* J. L. Barnard, *Gammarella* Bate, *Nuuanu* J. L. Barnard, and new genus. Uropod 3 miniaturized as in category 9 but article 2 of pereopod 7 broadly expanded, hatchet-shaped.

J. Weckeliids, formerly hadziids, to contain *Weckelia* Shoemaker, *Alloweckelia* Holsinger and Peck, *Mexiweckelia* Holsinger and Minckley, *Mexiweckelia particeps* Holsinger and Minckley (new genus, Holsinger, in prep.). Uropod 3 aequiramus. Female gnathopod 2 enfeebled, palm distinct, lined evenly with weakly bifid spines, posterior bent setae not fully developed on palm. Inner lobes of lower lip weak. Possibly derivative from ceradocids (to follow) or directly from crangonychoids.

K. Ceradocids, to contain all other fully marine gammaridan genera lacking coxal gill 7, bearing gills 2-6, bearing fully subchelate gnathopods, nonvermiform body, normal oostegites and pleopods, uropod 3 basically magniramus and aequiramus except in apomorphic genera. Including *Paraeckelia* Shoemaker, a former hadziid.

1. Ceradocins.

Infra group a. Ceradocins, *Ceradocus* Costa, *Ceradomaera* Ledoyer, *Paraeckelia* Shoemaker, *Ceradocoides* Nicholls. Group IVJ weckeliids, probably descend at this point.

Infra group b. Paraceradocins. Antenna 2 with articles 4-5 elongate, slightly thickened. *Paraceradocus* Stebbing, *Quadrivisio* Stebbing.

Infra group c. *Anelasmopus* Oliveira, *Elasmopoides* Stebbing, *Maeropsis* Chevreux, *Maera* Leach.

Infra group d. *Elasmopus* Costa.

Infra group e. *Parelasmpus* Stebbing, *Mallacoota* J. L. Barnard, *Ifalukia* J. L. Barnard, *Beaudettia* J. L. Barnard.

2. *Parapherusa* group. Uropod 1 and uropod 3 aberrant. *Parapherusa* Stebbing.

3. Maerellins. Peduncle of uropod 3 elongate. *Maerella* Chevreux, *Jerbarnia* Croker.

L. Kerguelenioids, to include *Kergueleniola* Ruffo (= *Kerguelenella* Ruffo). Like ceradocopsids but body vermiform.

V. Bogidiellids, to include *Bogidiella* Hertzog, *Bollegidia* Ruffo. Body vermiform, coxal gills reduced to 4 pairs, brood plates with dense setae confined terminally, some brood plates geniculate.

VI. *Pseudingolfiella* Noodt.

PROBLEMS OF CONVERGENCE

The higher classification of gammaridean Amphipoda is fraught with difficulties, among them convergence. The problem of the third uropod in hadziids is just one of many for which morphologists alone may never have answers. For example, crangonychoids (Bousfield, 1973) are marked either by sternal gills or bifid spines densely lining one or more of the gnathopodal palms. Because loss of structure is the trend in gammaridean evolution, the loss of these gills and spines could result in a host of descendents unrecognized in other superfamilies. Characters frequently do not occur universally in a higher taxon of amphipod, though closely related or inclusive taxa can often be recognized by marker attributes. Some crangonychoids lose sternal gills, some lose coxal gill 7 and others lose bifid palmar spines, but if the first and last are present, or if an apomorphic species can otherwise be adjoined in an obvious evolutionary sequence, then one may recognize a crangonychoid. *Eoniphargus* Ueno, for example, a Japanese hypogean gammaroid, might have crangonychoid ancestry except that the male calceoli are tympanic, rather than paddle-shaped. By that character, *Eoniphargus* is also not a member of the greater hadzioids and probably should be derived from a gammaroid (greater Gammaridae) ancestry, even though coxal gill 7 is absent. A geographic companion, *Awacaris* Ueno, is clearly analogous to *Eoniphargus* in scores of attributes, though uropod 3 is aequiramus, whereas uropod 3 of *Eoniphargus* is dispariramus and parviramus. *Awacaris* therefore appears related to the marine ceradocins and the bogidiellids with aequiramus uropod 3 but its gnathopods are far more apomorphic than those of *Eoniphargus*, which has the apomorphic uropod 3. However, it also shows plesiomorphy in the almost imperceptible remnant of article 2 on the outer ramus. Uropod 3 of *Phreatogammarus* (crangonychoid) also is aequiramus in contrast to all of its congeners. The dispariramus uropod 3 greatly resembles that of Notogean syncarids and

could be conceived as a plesiomorphic attribute, but the aequiramus uropod 3 would have to be derived from that plesiomorphic condition by loss of article 2 on the outer ramus without concomitant reduction of the inner ramus. Most of the ceradocid marine gammaroids possess the aequiramus uropod 3 but it is also present in the weckeliids and in the bogidiellids, kerguelenioids, awacarids and phreatogammarids. The aequiramus uropod 3 also has the rami more or less equal in thickness and armaments. The greater proportion of gammaridans carry the dispariramus uropod 3, or its derivatives, with the outer ramus incipiently or fully biarticulate and the inner ramus of diverse shapes and lengths. Ancestry in taxa with severe reduction in any component of uropod 3 cannot necessarily be traced. The aequiramus uropod 3 can be shown to be ancestral to the fully parviramus stage (as seen in the marine *Beaudettia* J. L. Barnard) as much as can the dispariramus uropod 3.

The probability is high that a consistent evolutionary trend in uropod 3 dominates the amphipods but much elucidation is required before this trend can be perceived. The question is very basic to the origins of Gammaridea because either the gammarid-like amphipods or the photidcorophiid amphipods such as *Gammaropsis*, characterized by fleshy telson and generally by aequiramus uropod 3, are presumed to be the most primitive living gammarideans. The ultimate question is whether or not the dispariramus uropod 3, associated generally with freshwater amphipods, is the more primitive and therefore signals a freshwater, Notogean, syncarid ancestry. In this evolutionary sequence one would assume that sternal gills mark the primitive state and that *Phreatogammarus*, isolated in New Zealand, would be the most plesiomorphic of the aequiramus and sternobranchiate forms, perhaps anticipatory to invasion of the sea. On the other hand, the fleshy telson of corophioids, coupled with the typical aequiramus uropod 3 of marine gammarideans may mark the ancestral stock, in which case the dispariramus uropod 3 is an apomorphic development.

AFFINITIES OF GALAPSIELLUS

Galapsiellus differs from *Paraniphargus* in the elongate peduncle of uropod 3, the size reduction of gnathopod 2 in both sexes, and the distad position of the basofacial spine on uropod 1. Gnathopod 2 approaches the mittenform-shape found in *Eriopisella* and its allies but is significantly larger than gnathopod 1 and the hand is weakly expanded apically in contrast to the eriopisellid genera.

Reduction of gnathopod 2 in male gammaridan amphipods is a common generic character. It typifies the eriopisellids, another group of genera known as weckeliids and other scattered genera of the gammaridan group. This characteristic is especially prevalent in anchialine or phreatic or anoculate groups.

Monod was undoubtedly correct in assuming a relationship of *G. lelouparum* to *Paraniphargus*. That genus, with two species, occurs

on western Pacific and Indian Ocean islands in freshwaters and presumably the species are basically hypogean although the type-species, *P. annandalei* Tattersall, 1925, was found among matted rootlets of a jungle stream at 152–244 m altitude in the South Andaman Islands, whereas the second known species, *P. ruttneri* Schellenberg, 1931, was found in a well in east Java.

Paraniphargus has the primitive gnathopod 2 exhibited by contiguous marine amphipods such as *Melita*, an enlarged appendage with short and weakly lobate wrist, and has the primitive uropod 3 with shortened peduncle.

Paraniphargus can be derived from a widely distributed tropical and temperate marine genus, *Melita*, with more than 50 species, often found in estuaries or in anchialine situations. *Paraniphargus* differs from *Melita* in the complete loss of medial setation on the maxillae. *Paraniphargus* is not well-known but one would suspect that it is also characterized by a loss of sexual dimorphism in gnathopod 2, which in *Paraniphargus* is a blend between male and female conditions of *Melita*. The loss of article 2 on the outer ramus of uropod 3 and the loss of all but E setae on mandibular palp article 3 are but extensions of conditions almost fully expressed in several marine species of *Melita*. *Paraniphargus* maintains the fleshy inner lobes typical of Indo-Pacific species of *Melita*. *Galapsiellus* carries the trends of reduction and sexual stabilization in gnathopod 2 to an extreme almost typical of eriopisellids. This group of genera, containing *Eriopisella* Chevreux, *Netamelita* J. L. Barnard, *Indoniphargus* Straskraba and *Microniphargus* Schellenberg, is characterized by fully mittenform gnathopods. Gnathopod 1 retains the melitid (mittenform) form but gnathopod 2 is reduced to the same size and has some of the same characteristics, such as medial or posterior pubescence and elongate wrist. In *Microniphargus* and *Indoniphargus* the gnathopods are axially reversed in contrast to *Eriopisella* as marked by the presence of a pubescent posterior lobe on the wrist of gnathopod 1, which in *Eriopisella* occurs on gnathopod 2. Eriopisellids also tend to be blind and anchialine and some of them, *Microniphargus* and *Indoniphargus*, have penetrated fully into phreatic waters of Belgium and India.

Galapsiellus is not an eriopisellid because its gnathopods are somewhat more primitive, though, like *Paraniphargus*, it could lie ancestral to eriopisellids. This group and the eriopisellids could also lie ancestral to niphargids.

Galapsiellus bears a remarkable resemblance to the enigmatic *Bathyonyx* Vejdovsky, 1905, from Lough Mask, a lake of Ireland. The body of *Galapsiellus* is more vermiform but the odd shape of the anterior coxae, weakly sinuous posteroventrally, is similar. In *Galapsiellus* much of this sinuosity can actually be eliminated by pressing the coxae very flat. The large, almost truncate head of *Bathyonyx* is very similar to that of *Galapsiellus*. *Bathyonyx* also has mittenform gnathopods with elongate wrists but they are closer to the eriopisellid kind than to

the galapsiellin kind because they are identical in size or gnathopod 1 is very slightly the larger. *Bathyonyx* is characterized by the retention of medial setae on maxilla 2 (maxilla 1 inner plate is unknown), the outer plate of maxilla 1 has the spines reduced to 4, uropod 3 is parviramus but the peduncle is short and the outer ramus is 2-articulate, the mandibular palp article 3 is more tumid and setose, and the telson is elongate.

Geographically and temporally *Galapsiellus* bears no relationship to crangonychoids, though apomorphic crangonychoids would be difficult to detect once the sternal gills, coxal gill 7, urosomal setation and bifid palmar spines were lost. Crangonychoid distribution appears to have been a product of Pangaea in the early Mesozoic. Crangonychoids are strictly of freshwater provenance and probably were widely distributed over the coalesced continental masses. They have survived primarily in Notogea, South Africa, and Nearctica with an outpost in the Falkland Islands. In Palearctica they were largely replaced by modern gammaroid genera but never reached Neotropica. There is no nearby source of crangonychoids to postulate an origin for *Galapsiellus* and the Galapagos Islands are too youthful to retain relicts of Pangaea.

Galapsiellus can also be derived from the widespread marine genus *Eriopisa*. The similarity between these genera is even greater than between *Galapsiellus* and *Paraniphargus*, because *Eriopisa* possesses the shortened anterior coxae not typical of *Paraniphargus*. Many species of *Eriopisa* have female gnathopod 2, and occasionally male gnathopod 2, more strongly reduced than in *Paraniphargus*, although none of them has gnathopod 2 as enfeebled as in *Galapsiellus*. *Eriopisa* is more plesiomorphic than either *Paraniphargus* or *Galapsiellus* in maxillae and uropod 3 and therefore could be ancestral to *Galapsiellus* but not to *Paraniphargus*. Uropod 3 of *Eriopisa* bears a moderately to well-developed article 2 and the medial margins of one or both maxillae bear setae. *Eriopisa* may not be directly descendent from ancestors like *Melita* because uropod 3 of the most primitive species of *Eriopisa*, *E. longiramus* Stock and Nijssen, is magniramus, a condition plesiomorphic to the parviramus uropod 3 of *Melita*. *Eriopisa longiramus* and *E. caeca* (S. Karaman) should be reestablished in *Psammogammarus* S. Karaman and differentiated from *Eriopisa* by loss of sexual dimorphism in gnathopod 2 and the evenness of spination on the palm of gnathopod 2 in the female. *Eriopisa longiramus* may further be distinguished generically as uropod 3 is almost magniramus, like *Pontoniphargus* Dancau.

Galapsiellus bears a resemblance to the *Maerella* subgroup of the *Ceradocus* group because of the elongate peduncle on uropod 3 and the shape of the telson. Male gnathopod 2 of *Jerbarnia* in that group has undergone an elongation reminiscent of *Galapsiellus* but otherwise the number of evolutionary steps between *Jerbarnia* (Micronesian marine) and *Galapsiellus* is far greater than between *Eriopisa* and *Galapsiellus*.

The occurrence of a phreatic amphipod in the Galapagos is striking because of the isolation of the archipelago from the mainstream of gammaridean dispersal and evolution. Nearby South America has only *Ingolfiella* Hansen (suborder Ingolfiellidea) and *Pseudoringolfiella* Noodt (suborder Gammaridea) occurring in its phreatic waters. *Galapsiellus* is very remote from those taxa and clearly has a marine origin.

In the Galapagos Islands, *Galapsiellus* has been collected (Monod and herein) in brackish anchialine waters presumed to be a mixture of intruding seawater and phreatic freshwaters percolating downslope to the sea from the highlands of Santa Cruz Island. Brackish sinkholes and emergent aquifers in mangrove swamps are often sufficiently fresh to be potable (5 ppt) and are so used by inhabitants of the island (pers. observ.). The presence of *Ampithoe* and *Cheiriphotis* in my sample suggests that *Galapsiellus* lived in far saltier water than 5 ppt as those genera are strictly marine. The mangrove pond I sampled may actually be a stratified pool of differing salinities so that my broadly cast sample may have covered several salinity regimes. If *Galapsiellus* is an emergent phreatic genus, the specimens of *Galapsiellus* may actually have been dying of exposure to high salinities as I caught them. On the other hand, the genus may be euryhaline and this may help to explain its immigrational adaptability from the sea.

CONCLUSION

Galapsiellus is considered to be an apomorphic melitid with the same kind of phreatiform adaptations found in the eriopisellids and niphargids. The best ancestral fit lies near *Eriopisa* although close morphological similarity occurs with *Paraniphargus*.

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